

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY
- LIGO -
CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Technical Note	LIGO-T2200160-v1	2022/07/28
Mode Matching for Triangular Ring Cavity Abstract		
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Part I

Abstract

In upcoming LIGO designs, a Phase Sensitive Optomechanical Amplifier (PSOMA) will be introduced to help mitigate readout losses in the LIGO interferometer. Though only at the tabletop stage, the PSOMA design is experiencing mode mismatch in its triangular ring cavities. The cause of this discrepancy is assumed to be in the mode matching lenses. Methods of analysis are to model the design with a thick lens, and consider lens aberrations. While a thick lens design is more straightforward to construct, considering lens aberrations is no trivial task. In this project, we take a conceptual idea of the cause and effects of lens aberrations, and apply them to Gaussian beams. The results given may provide much better analysis on how optics play a role in not only the PSOMA cavity, but in the LIGO interferometers.